

Climate Science & Services

*Providing the Information That People Need
For A Changing World*



The Honorable Dr. Jane Lubchenco

Under Secretary of Commerce for Oceans and Atmosphere and Administrator
National Oceanic and Atmospheric Administration

U.S. Center | COP-15

December 14, 2009





President Obama's Commitment



“I don’t think I have to emphasize that climate change is one of the defining challenges of our time. The science is clear and conclusive, and the impacts can no longer be ignored.”

— *President Obama, Major Economies Forum, Italy, July 2009*



Outline

Climate Services

*'Global Climate Change
Impacts in the United States'*
Report

Oceans and Climate

Enhanced Climate Science





World Climate Conference-3



World Climate Conference - 3

Better climate information for a better future



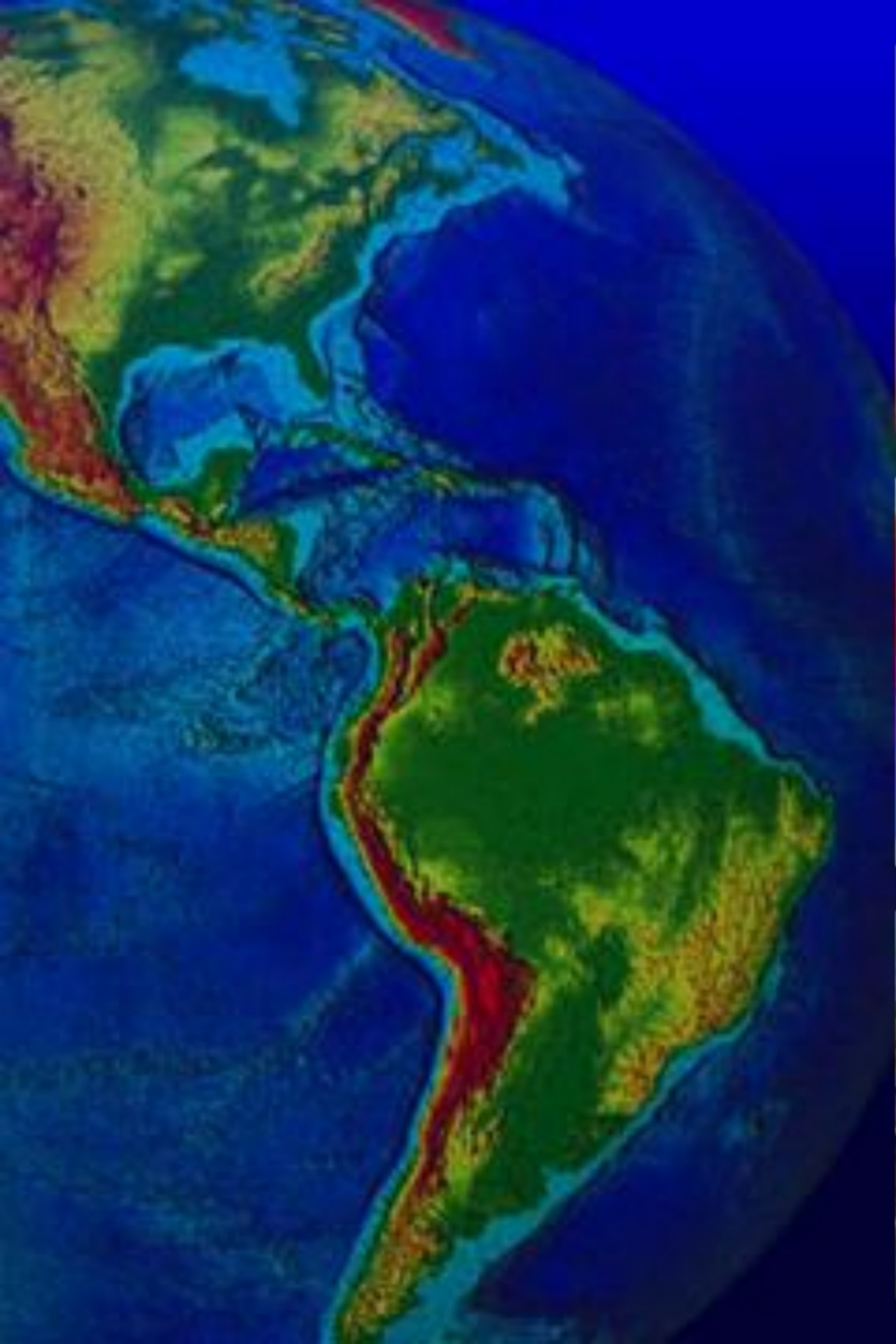
<http://www.wmo.int/wcc3>

Geneva, Switzerland
31 August–4 September 2009
Geneva International Conference Centre



World
Meteorological
Organization
Weather • Climate • Water





GLOBAL CLIMATE CHANGE IMPACTS IN THE UNITED STATES



UNITED STATES GLOBAL CHANGE RESEARCH PROGRAM



Sectors and Regions

ENERGY



WATER



AGRICULTURE



TRANSPORTATION



ECOSYSTEMS



HEALTH



SOCIETY



United States
Global Change
Research Program

Global Climate Change Impacts on the United States

Impacts of Climate Change

Climate change is apparent now across our nation.

Trends observed in recent decades include:

- rising temperatures,
- increasing heavy downpours,
- rising sea level,
- longer growing seasons,
- reductions in snow and ice, and
- changes in the amounts and timing of river flows

These trends are projected to continue, with larger changes resulting from higher amounts of heat-trapping gas emissions, and smaller changes from lower amounts of these emissions.

Responding to Climate Change

“Mitigation”

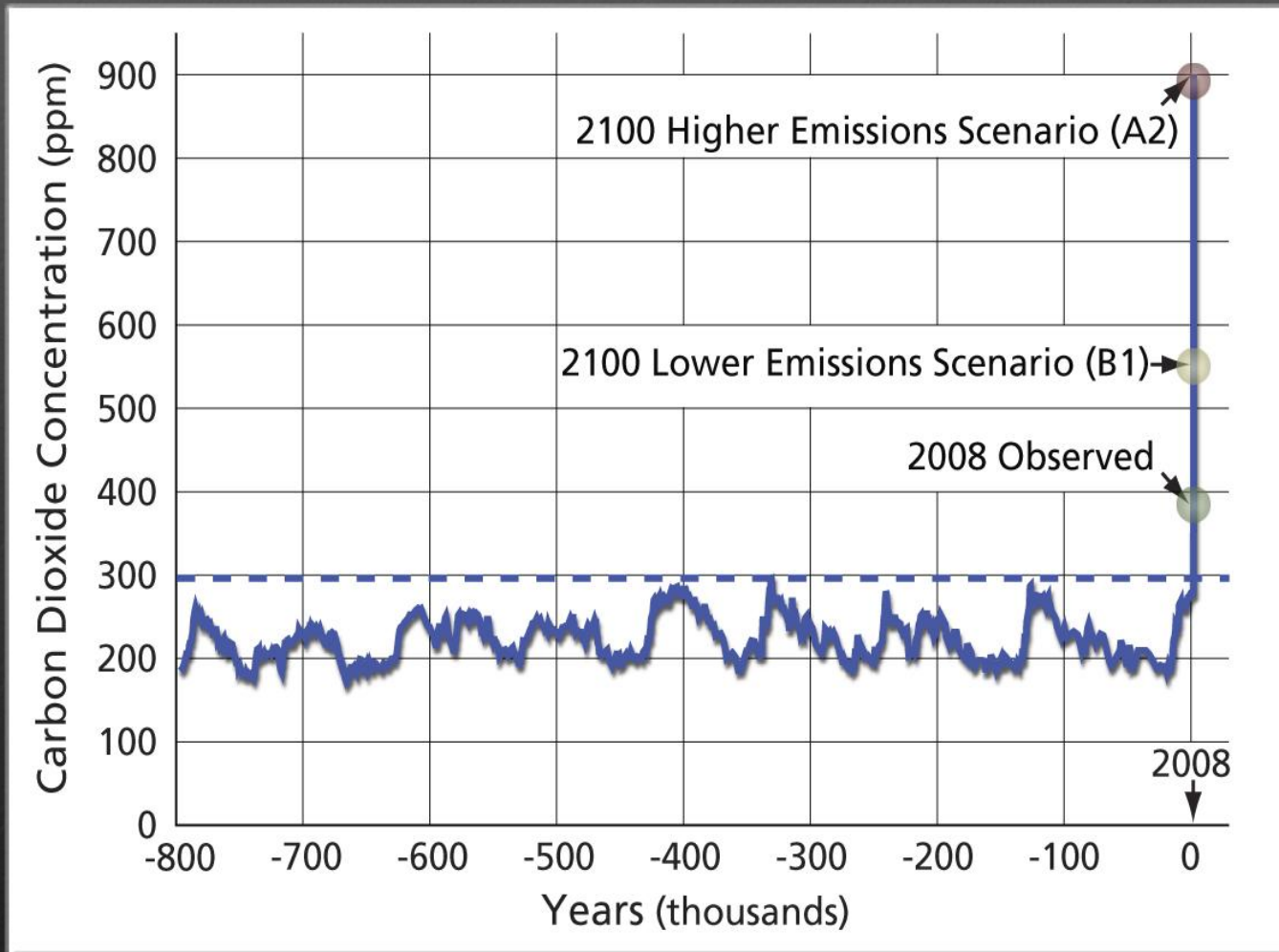
Options for limiting climate change

“Adaptation”

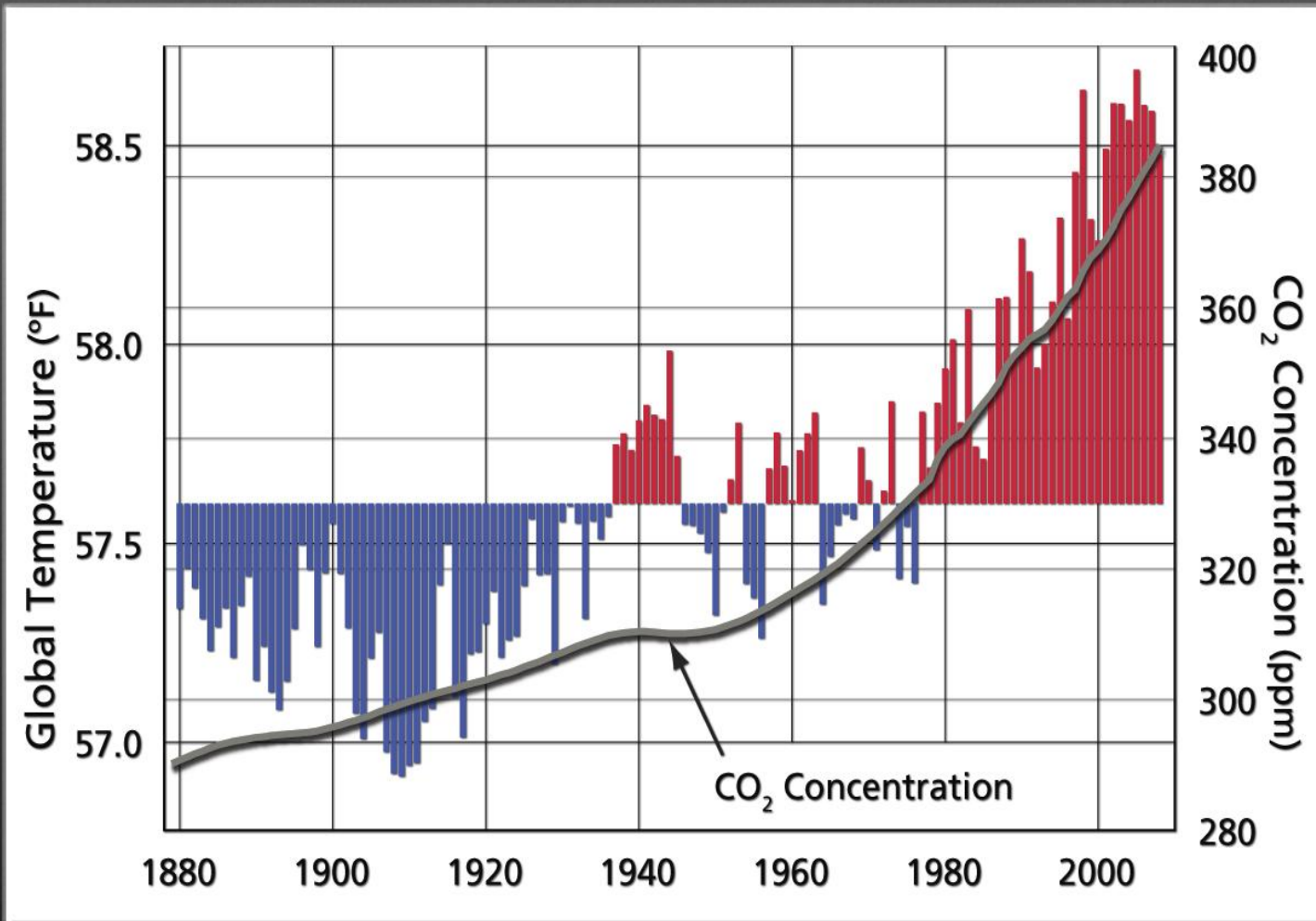
Responding to present and future climatic conditions



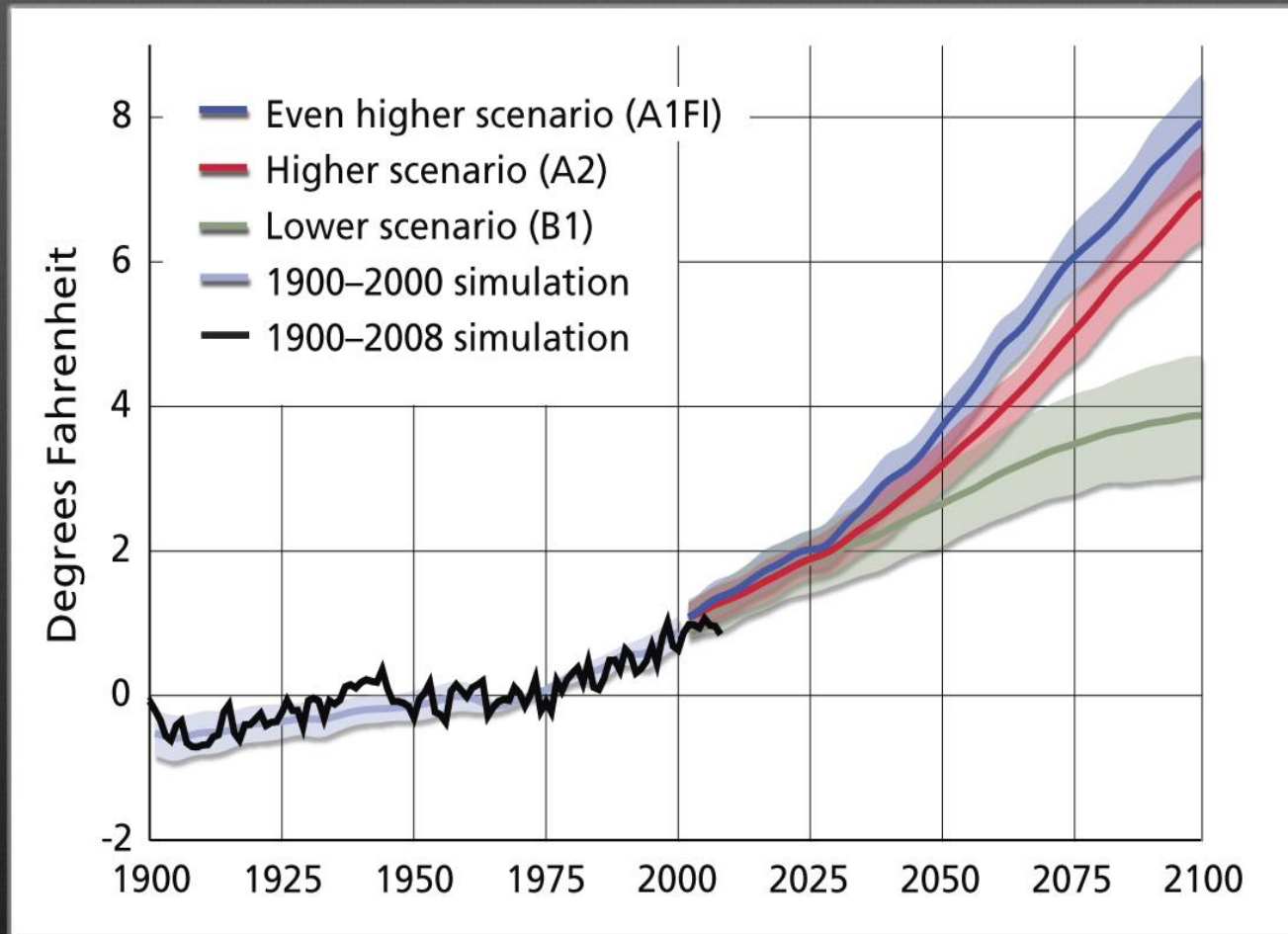
800,000 Years of CO₂ Concentrations



Global Temperature and Carbon Dioxide



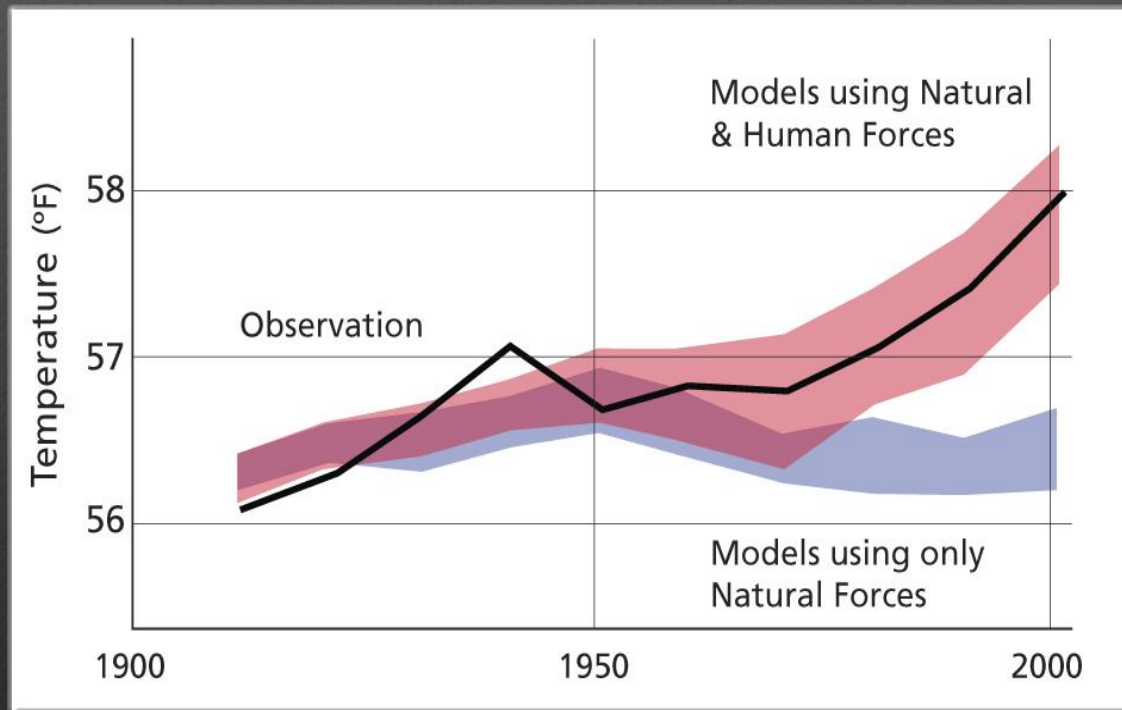
Global Average Temperature 1900 - 2100



Changes are relative to the 1960 - 1979 average.



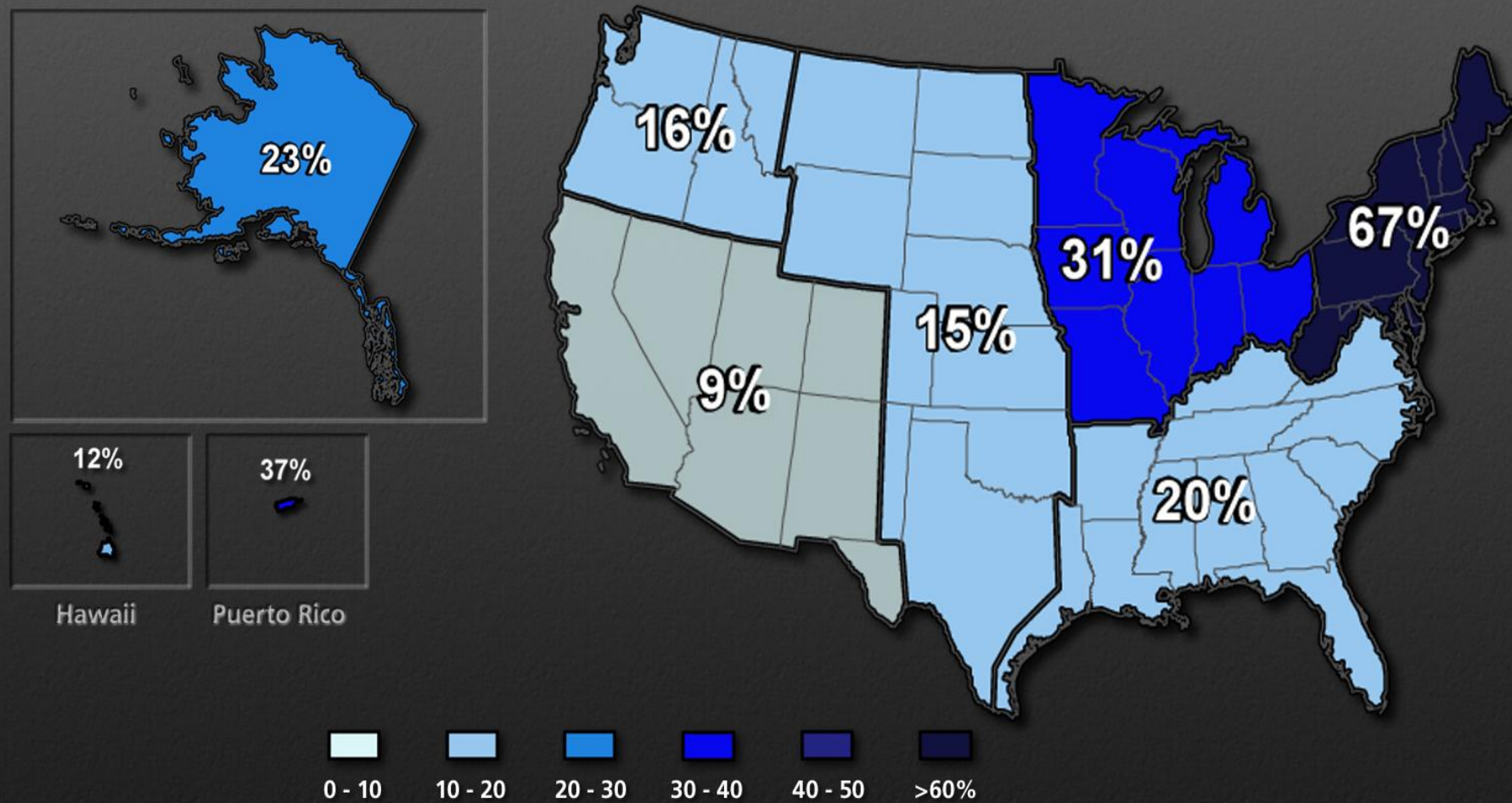
Separating Human and Natural Influences on Climate



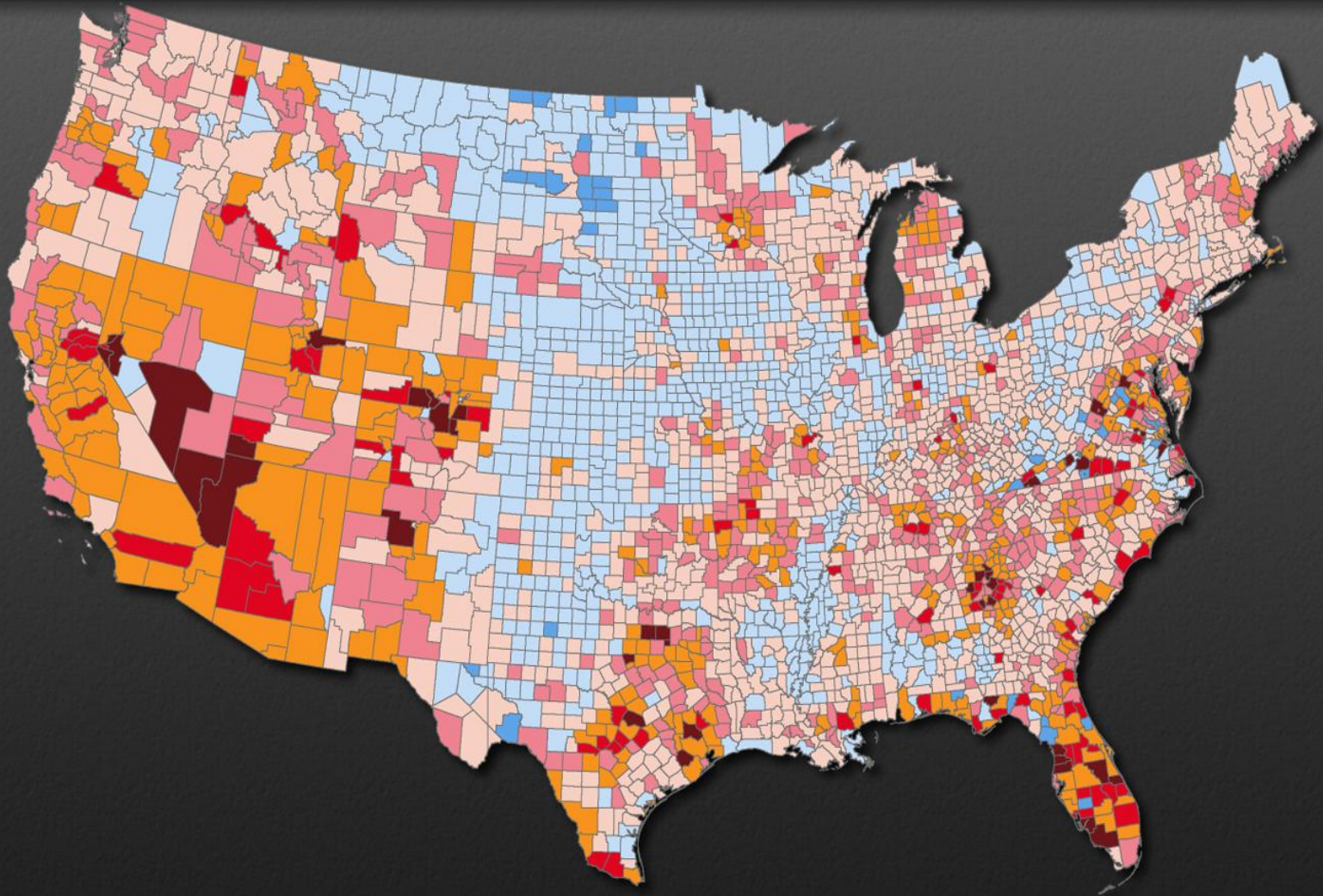
As the blue band indicates, without human influences, temperature over the past century would actually have first warmed and then cooled slightly over recent decades.

Increases in Amounts of Very Heavy Precipitation 1958 to 2007

Percent Change



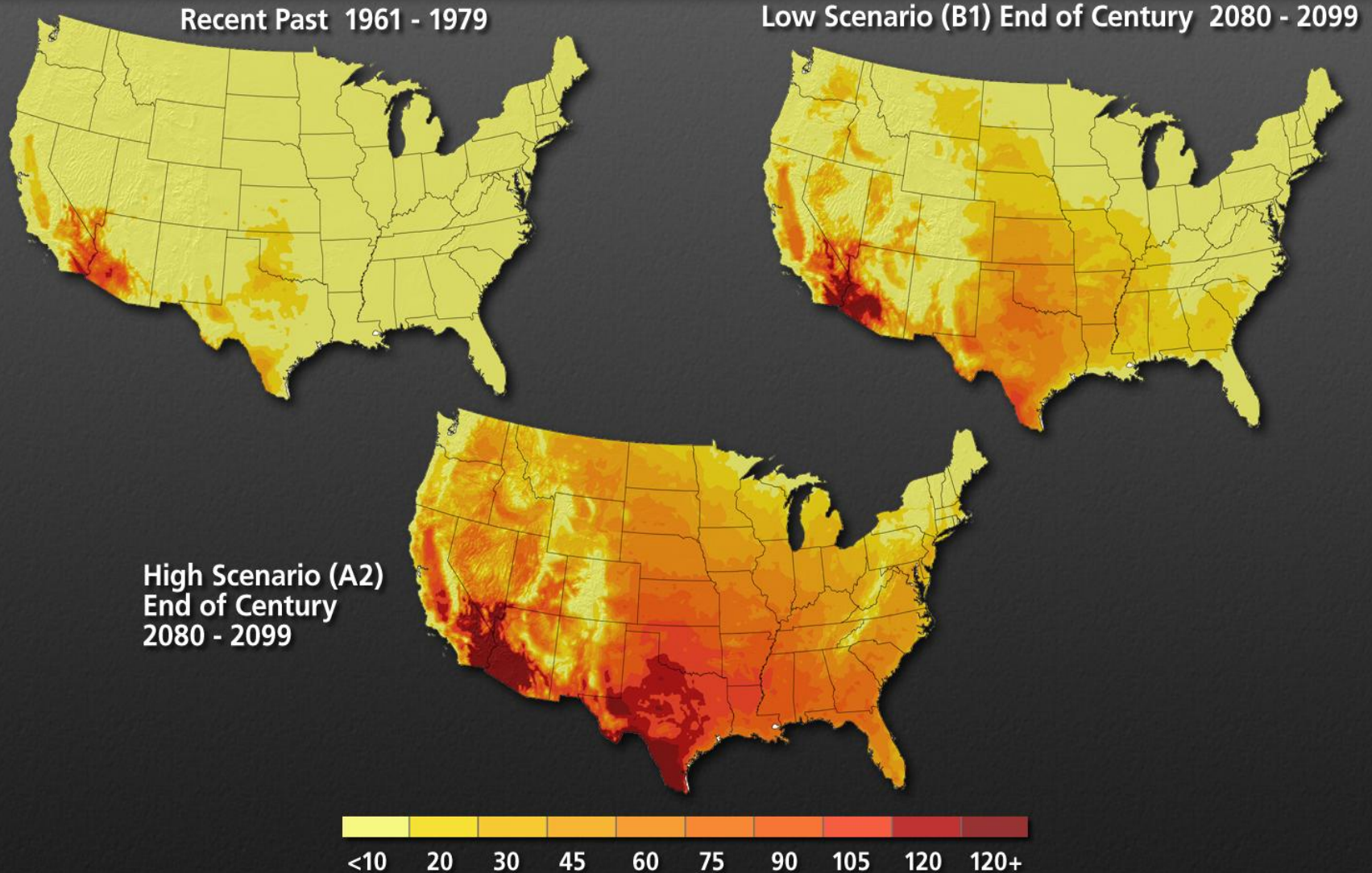
Change in Population 1970 to 2008



■ < -50% ■ -49 - -1% ■ 0 - 49% ■ 50 - 99% ■ 100 - 249% ■ 250 - 499% ■ > 500%

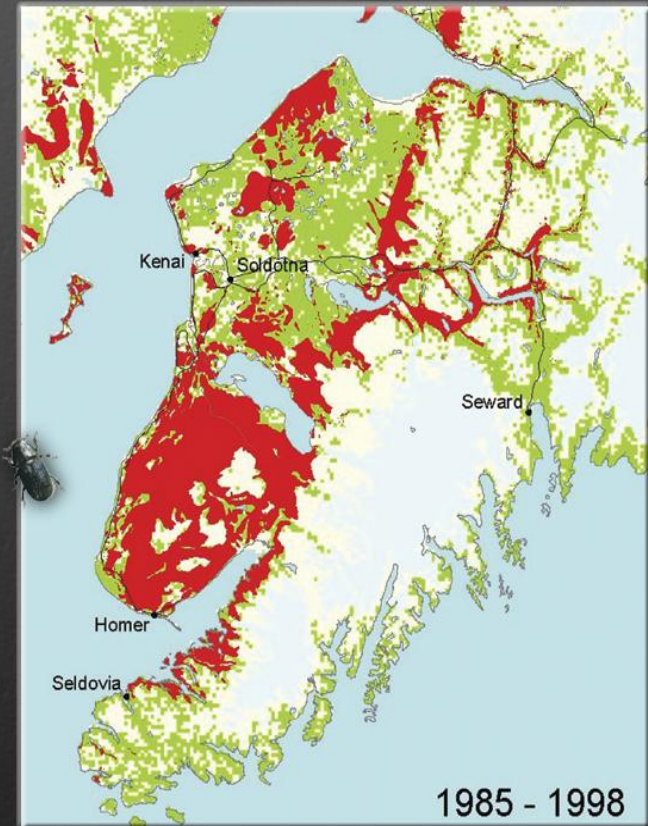
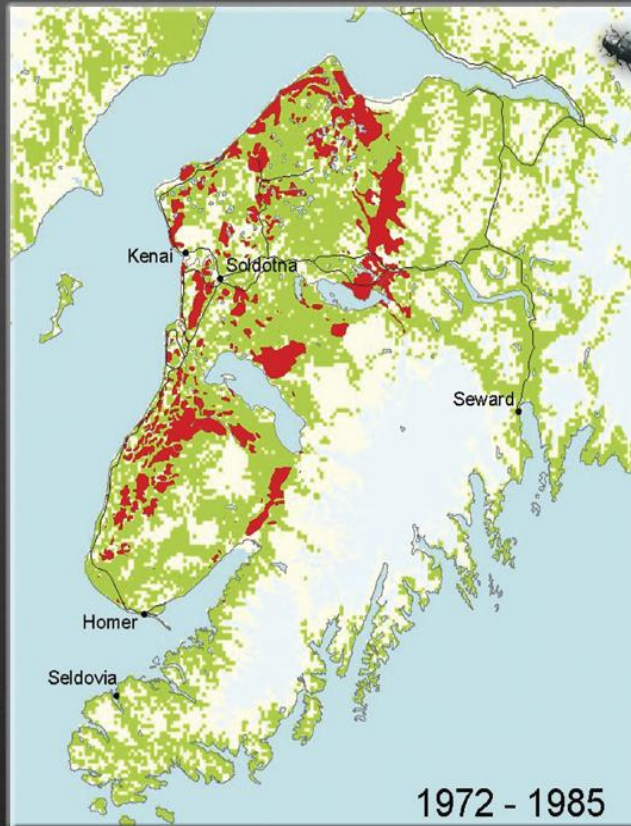


Number of Days Over 100°F



Alaska Spruce Beetle Infestation

Kenai Peninsula (1972 to 1998)

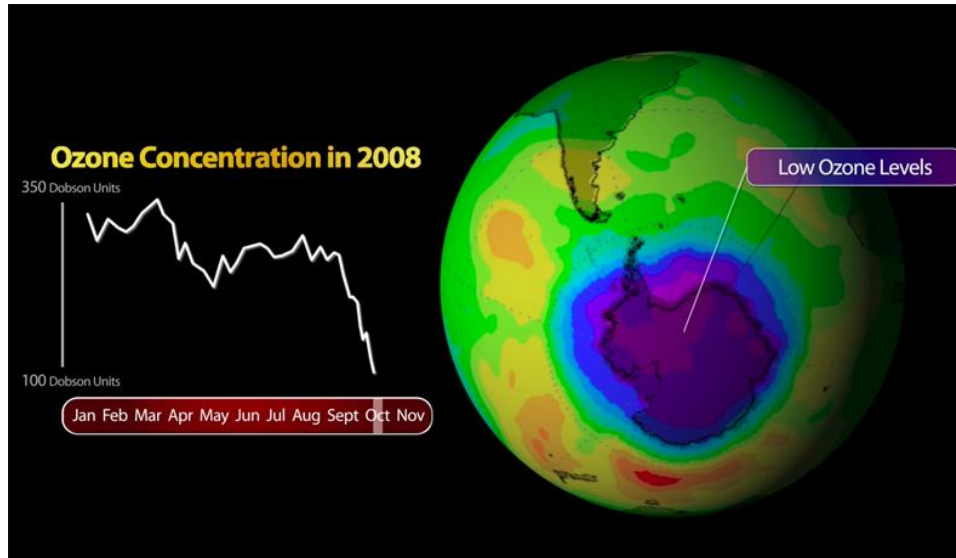


- Spruce Beetle
- Forested
- Non-forested
- Major waterbodies
- Glaciers





Continued Investments in Climate Science

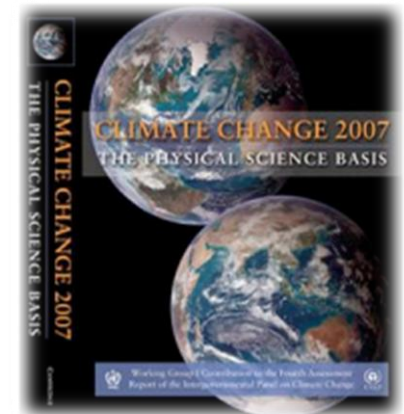
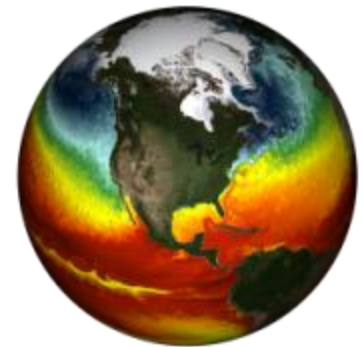
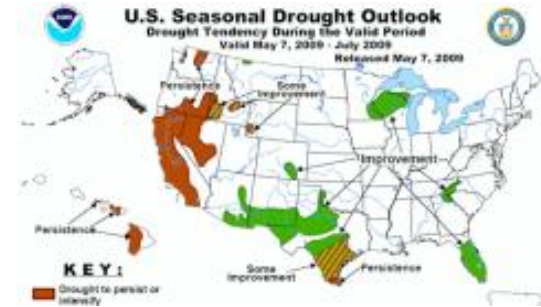




NOAA's climate science and services

Maintain the programs that form the basis for services including:

- ☑ Observing systems
- ☑ Data management, stewardship and delivery systems
- ☑ Problem focused and fundamental climate research
- ☑ Climate modeling, predictions and projections
- ☑ Climate assessments, products and services
- ☑ Regional infrastructure
- ☑ Capacity building, literacy, education





NOAA Operates 109 Observing Systems



Ocean and Coastal Observation Systems

Atmospheric Observations

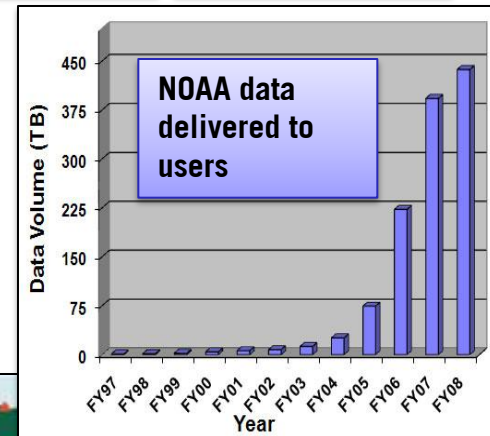
Remote sensing/satellite observation

Land-based Observations

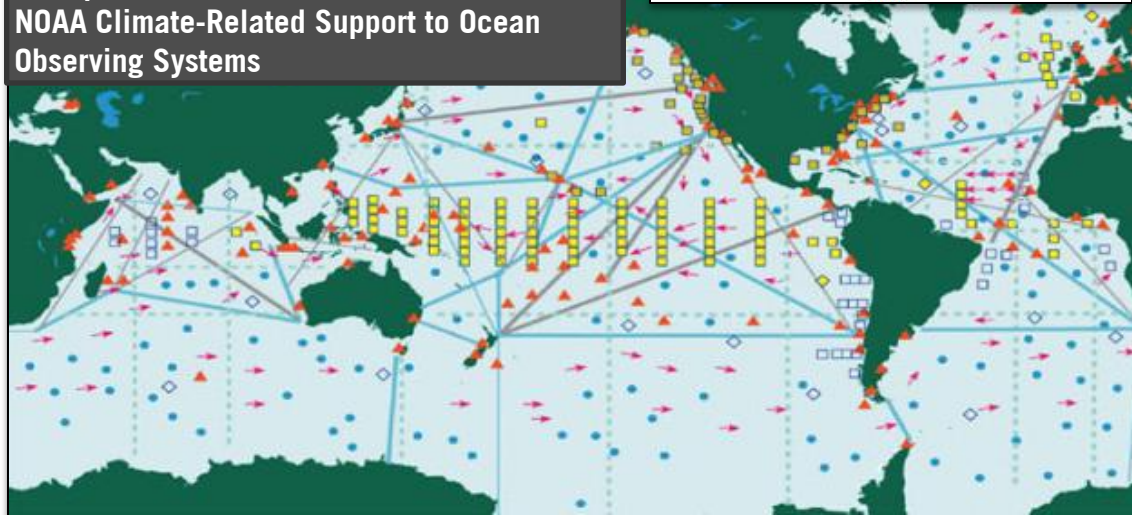
Many observation systems built with extensive international partnership

Plans to complete, enhance, and deliver more climate information to users

NOAA maintains large databases of both historical and current climate data



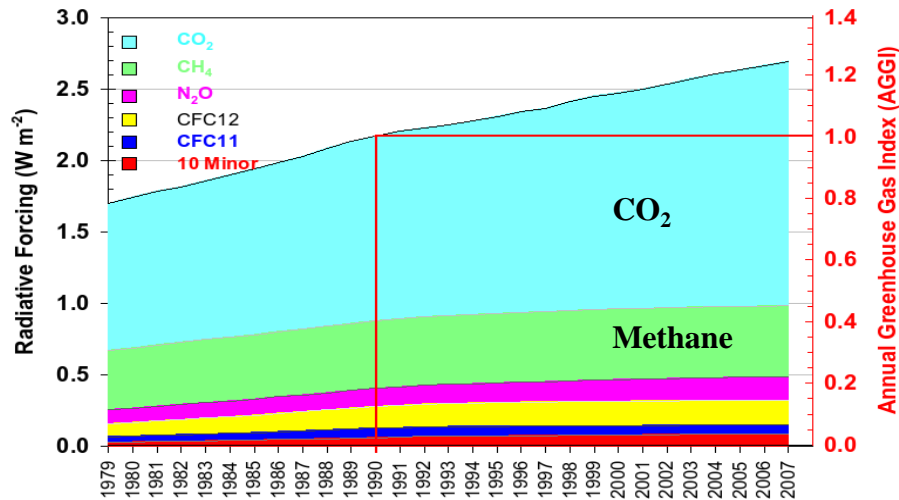
Example:
NOAA Climate-Related Support to Ocean
Observing Systems



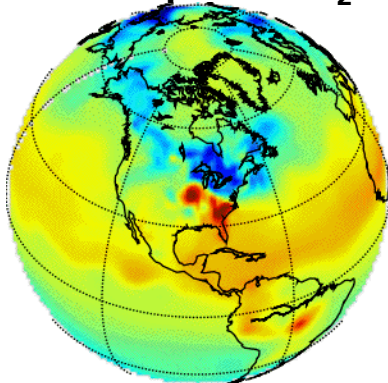


NOAA Monitors Atmospheric Carbon Dioxide and other Greenhouse Gases

NOAA Annual Greenhouse Gas Index

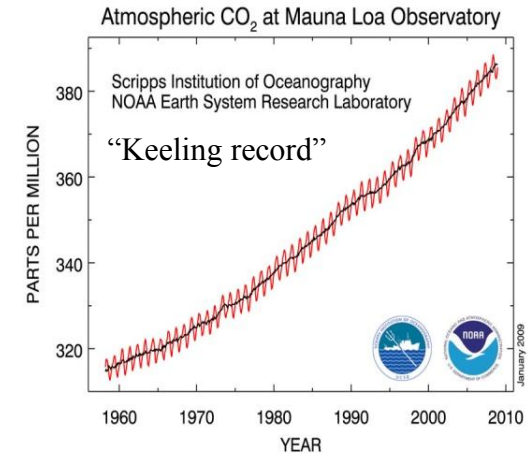


Carbon Tracker: Atmospheric CO_2



carbontracker.noaa.gov

CO_2 Trends



CO_2 Accounting

Atmospheric CO_2 Account		10 ¹⁵ grams of carbon per year*
Date	Origin	Balance
annual	Biosphere	- 3
annual	Ocean	- 2
annual	Fossil Fuel Burning	+ 7
annual	Deforestation	+ 2
Annually Reported Atmospheric Balance		+ 4

* These numbers are approximate and are for the whole globe



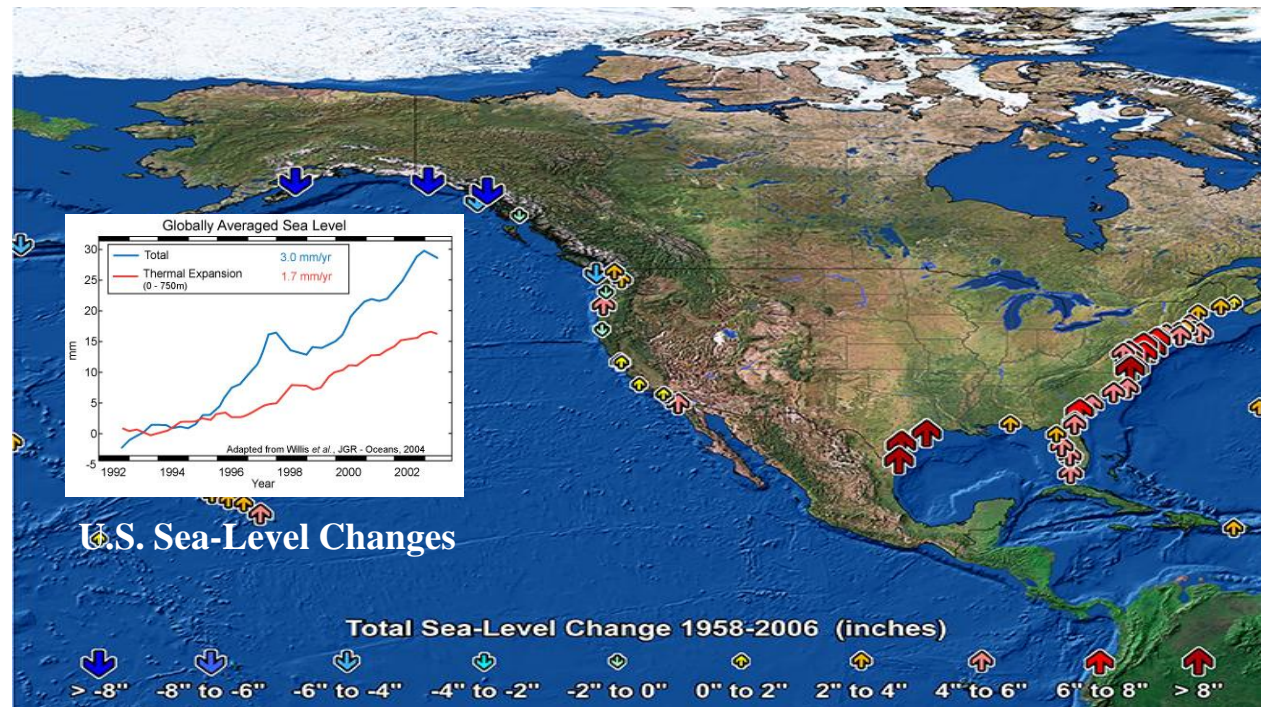
NOAA Measures Change in Sea Level

NOAA integrates measurements of water level, land elevation, ocean temperature, sea ice extent and thickness

Need to address both global drivers and local differences in sea level rise

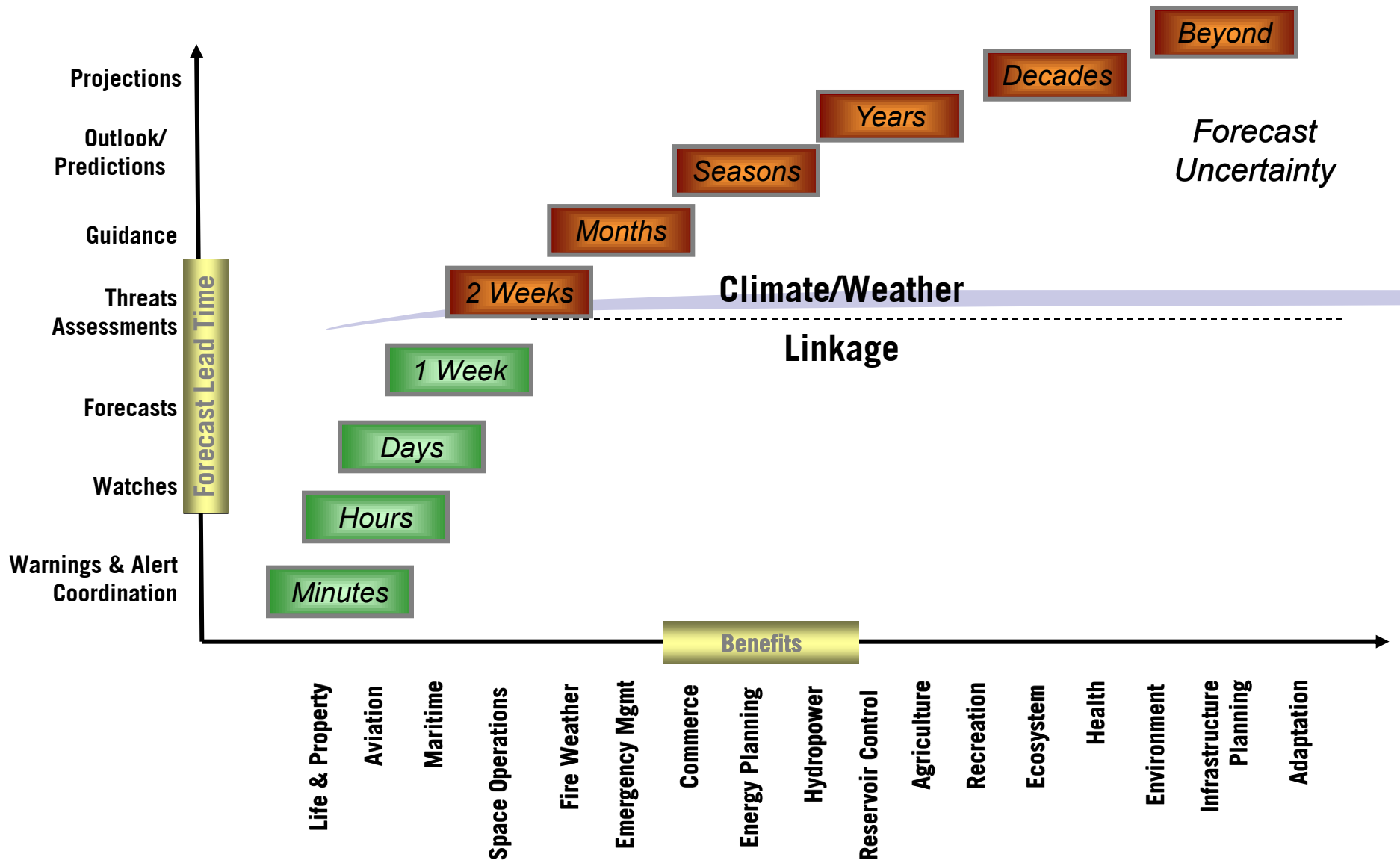
Combining physical impacts of sea level change with improved understanding of coastal vulnerability and resilience

Over the past 50 years, the world's oceans have absorbed 84% of the heat from global temperature increases, causing the oceans to warm and to expand.





NOAA Provides A Seamless Suite Of Forecast Products



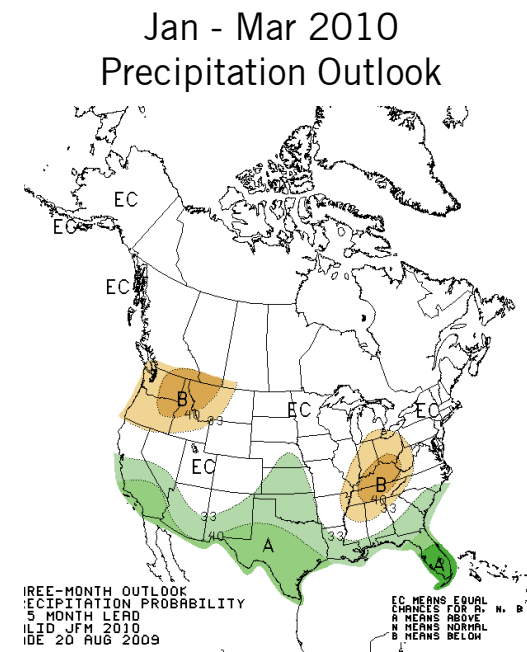
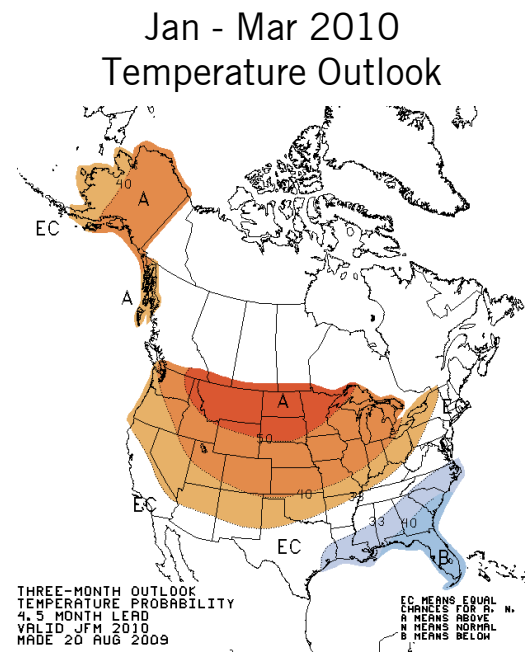
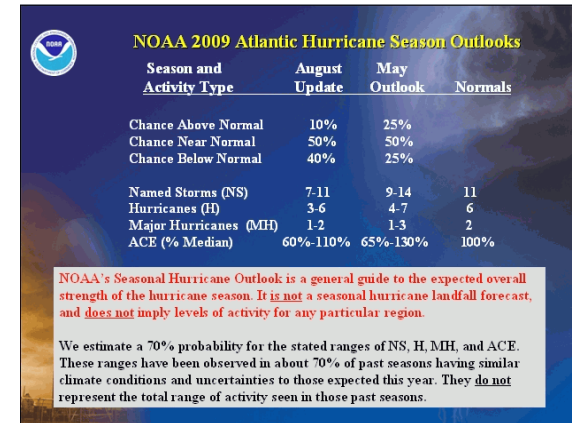


NOAA Models:

Used For Operational Climate Outlooks and Prediction Products

Focus on months, seasons, and year-to-year

- Regular Hazards Risks Assessments
(US, Global Tropics)
- Monthly & Seasonal Precipitation & Temperature
- Seasonal Drought Outlooks
- Seasonal Hurricane Outlooks
(Atlantic and Eastern Pacific)
- El Nino/La Nina Outlooks

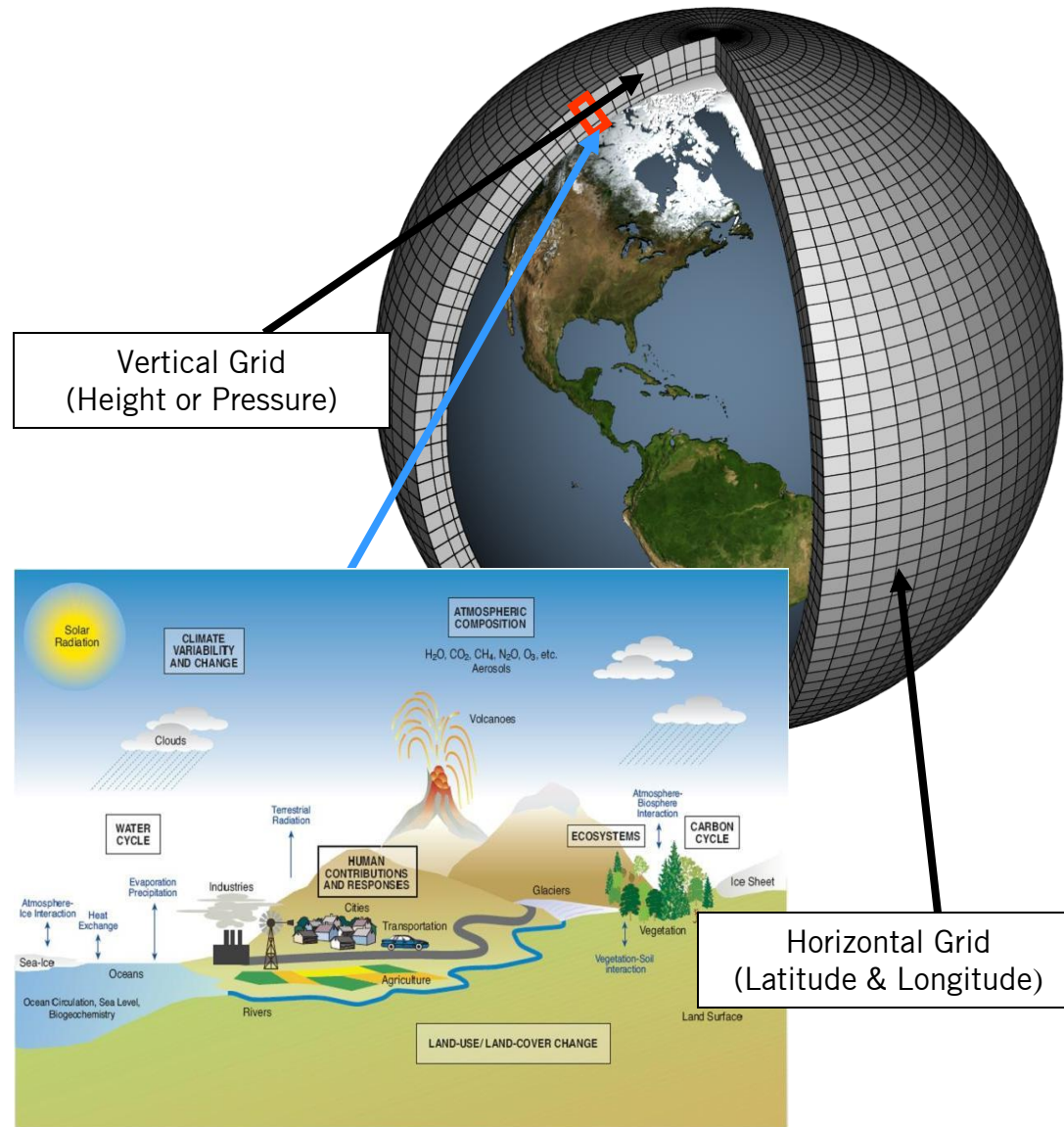




NOAA Develops Earth System Models for Climate Prediction and Projection

Earth System Models mathematically represent Earth's major physical processes

Model equations operate on a grid and are solved on a supercomputer (high performance computing).





NOAA Has Helped The Nation Progress In Its Understanding Of Climate Change

NOAA led the production of 9 of the 21 assessment reports required by the GCRA and has contributed significantly to the others.

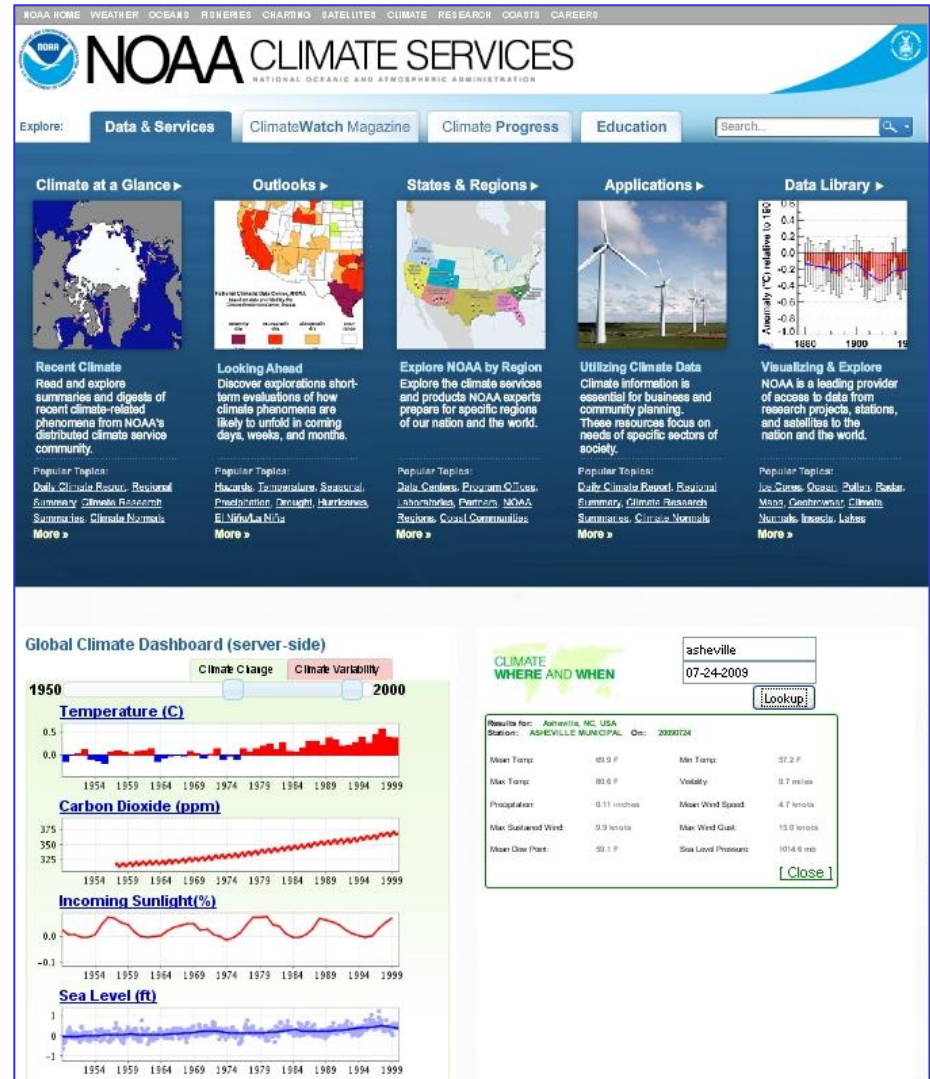
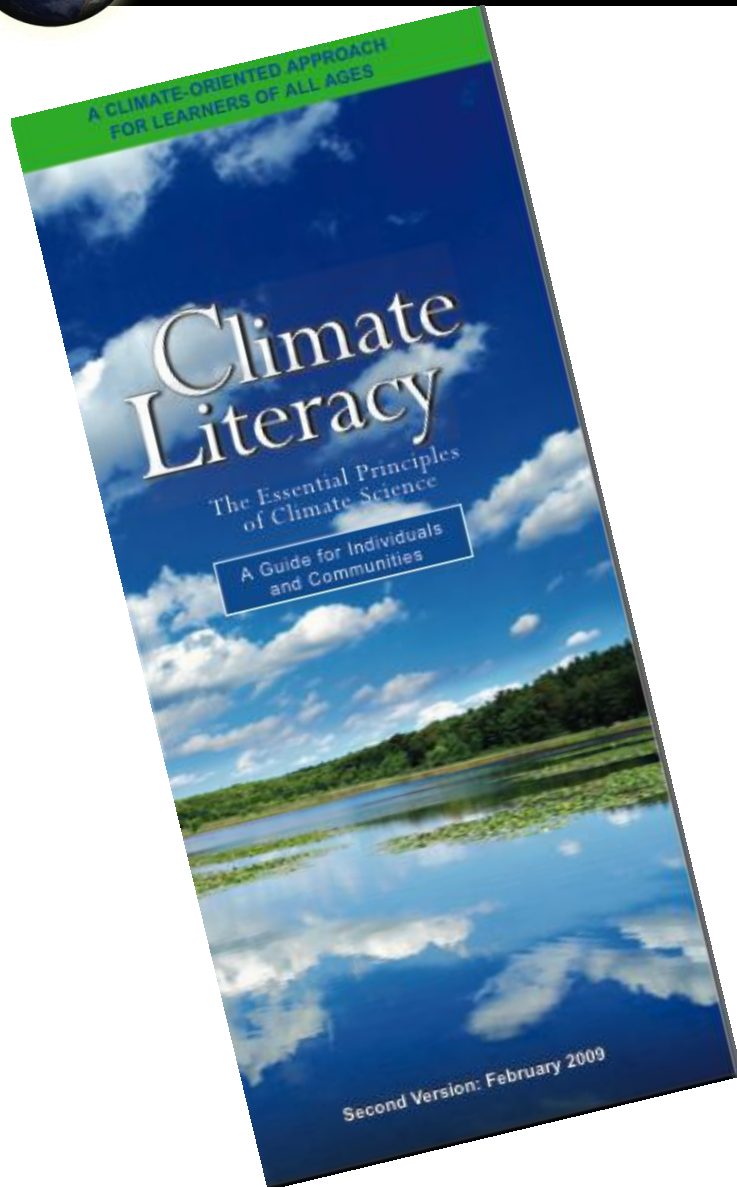
NOAA played a strong leadership role in the Global Climate Change Impacts Report.

64% and 73% of the US Government authors and reviewers of the Third and Fourth IPCC assessment reports, respectively, for Working Group 1 were from NOAA





Communicating NOAA's Climate Information



Phase 1 Prototype to be released in late Fall 2009



Towards a Global Framework for Climate Services

Intergovernmental Meeting, January 2010

Establishing a Task Force

Terms of Reference for a Global Framework for
Climate Services

National Actions



Thank you



QUESTIONS?

